

Appl. No.: 10/665,917
Amdt. dated: June 2, 2006
Reply to Office Action of: March 6, 2006

PATENT

Amendments to the Drawings:

The attached sheet of drawings includes changes to Fig. 5(a). This sheet, which includes Fig. 5(a) replaces the original sheet including Fig. 5(a). A new sheet including Fig. 6 has been added

Attachment: Replacement Sheet
Annotated Sheet Showing Changes
New Sheet

REMARKS/ARGUMENTS

Claims 1-20 are pending, of which claims 7-16 have been withdrawn. Claims 1-6 have been amended. New claims 17-20 have been added. The specification and drawings have been amended to correct minor informalities. No new matter has been introduced. Applicants believe the claims comply with 35 U.S.C. § 112.

Fig. 6 has been included to show additional features of the invention specified in the claims. More specifically, Fig. 6 shows non-magnetic regions 100 provided on both ends of the anti-ferromagnetic layer 11. This feature is described in the original disclosure. Therefore, no new matter has been introduced.

Rejections under 35 U.S.C. § 112

Claims 2-6 stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention.

Applicant respectfully submits that claims 2-6 should now be acceptable because they have been amended to claim the subject matter. For example, claim 2 has been amended to refer to both non-magnetic regions. Claim 3 has been amended to refer to the first electrode layers. Claim 4 has been amended to refer to second electrode layers.

Rejections under 35 U.S.C. § 103(a)

Claims 1-6 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Han et al. (U.S. Patent No. 6,383,574).

Applicant submits that independent claim 1 is patentable over Han et al. because, for instance, Han et al. does not disclose or suggest an anti-ferromagnetic layer having non-magnetic regions on both ends thereof, wherein a width between the non-magnetic regions of the anti-ferromagnetic layer is smaller than a track width of the first ferromagnetic layer.

The claimed invention is directed to a composite magnetic head with impurities that may be implanted into an anti-ferromagnetic layer for eliminating the

magnetic property of the anti-magnetic layer at the electrode overlaid portions. The structure does not use the low sensitivity region on both ends of the free layer and, as a result, can provide a magnetoresistive head capable of detecting magnetic signals from the media at higher sensitivity. The low sensitivity region on both ends of the free layer can be made into the insensitive region. See, e.g., paragraphs [0057], [0061], [0062], and Fig. 6.

Han et al. is directed to selectively implanting ions into the magnetoresistive (MR) layer. The ion implanting is performed on both edges. As stated in column 9, lines 8-14, "The dose of chromium implanting ions 26 is selected to provide an atomic percent of chromium within the ion implanted portions of the magnetoresistive (MR) ferromagnetic pinned layer 18a and 18b and the ion implanted portions of the magnetoresistive (MR) ferromagnetic free layer 14a and 14b of from about 30 to about 50 percent." Thus, multiple layers, including the free layer, are implanted with ions.

The claimed invention is different from Han et al., at least in that it provides non-magnetic regions 100 (see Fig. 6) only to anti-ferromagnetic layer 11 to make respectively low regions near the edges of the free layer due to the bias layer becoming insensitive. Han et al. does not teach or suggest providing non-magnetic regions at both ends of an anti-ferromagnetic layer, wherein a width between the non-magnetic regions of the anti-ferromagnetic layer is smaller than a track width of the first ferromagnetic layer.

For at least the foregoing reasons, Applicant respectfully submits that independent claim 1 and claims 2-6 depending therefrom are patentable over the cited art.

New claims 17-20 are directed to similar patentable features of the invention. For example, claim 18 states that the second ferromagnetic layer is in contact with the anti-ferromagnetic layer. Independent claim 19 states, among other things, that a magnetic head comprises a non-magnetic layer provided above the free layer; an anti-ferromagnetic layer adjacent to the ferromagnetic layer, wherein the anti-ferromagnetic layer has a non-magnetic portion and a magnetic portion, wherein a width in a track with direction of the free layer is larger than a width in the track width direction of the magnetic portion. Thus, claims 17-20 are allowable.

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CONCLUSION

In view of the foregoing, Applicant believes all claims now pending in this Application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested.

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 650-326-2400.

Respectfully submitted,



Chun-Pok Leung
Reg. No. 41,405

TOWNSEND and TOWNSEND and CREW LLP
Two Embarcadero Center, Eighth Floor
San Francisco, California 94111-3834
Tel: 650-326-2400
Fax: 415-576-0300
Attachments
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FIG.5

